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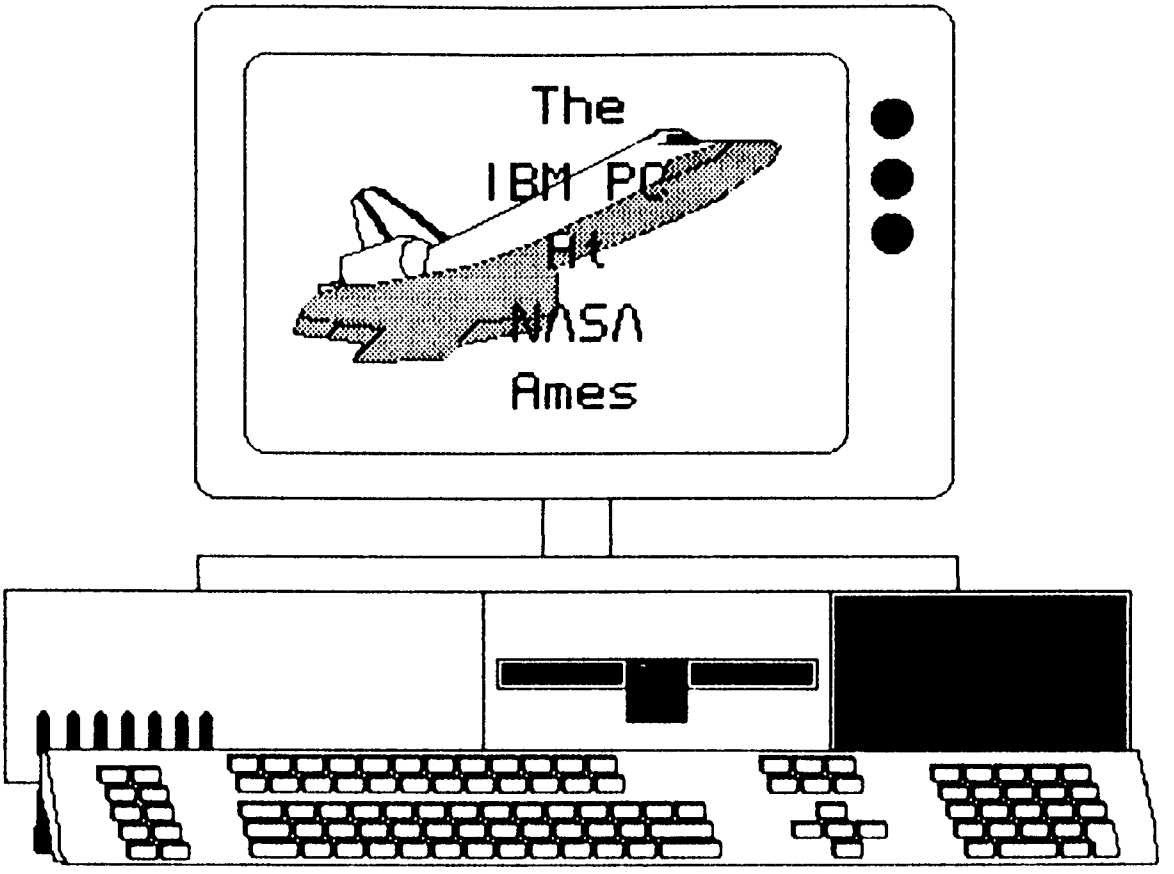

James P. Peredo

At NASA Ames, the IBM PC has penetrated the computer user's world. Along with the Apple Macintosh, the PC is now the most common personal computer at the Center. With some of the latest in software and hardware technology, the IBM PC has been made into a most helpful tool--with an eye on the market and a hand in the future of Ames.

Like any other large company, Ames relies very much on its computing power to get work done. And, like any other large company, finding the IBM PC a reliable tool, Ames uses it for many of the same types of functions as other companies. Presentation and clarification needs demand much of graphics packages. Programming and text editing needs require simpler, more-powerful packages. The storage space needed by NASA's scientists and users for the monumental amounts of data that Ames needs to keep demand the best database packages that are large and easy to use. Availability to the Micom Switching Network combines the powers of the IBM PC with the capabilities of other computers and mainframes and allows users to commu-

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nicate electronically. These four primary capabilities of the PC are vital to the needs of NASA's users and help to continue and support the vast amounts of work done by the NASA employees.

In the early days of the computer, there were no computer graphics--mostly because these computers were large mainframes that were dedicated mainly to solving problems. Though there are graphics packages on mainframes today, they fail to be as user friendly as the PC. It was with the advent of the personal computer that graphics packages became practical and advantageous. At Ames the two main uses for graphics are for clarification needs and presentation needs.

Freehand graphics are a type of computer graphics where absolute precision is not necessary. In the Ames user's world, a freehand graphics package would be perfect for diagrams and flowcharts, etc. After the arrival of the Apple Macintosh and its trendsetting MacPaint freehand graphics program, a call went out for similar graphics programs for other machines. Seeing a large market of IBM PC users, software manufacturers put out competitive products resulting in a few excellent packages. The purchase of these packages for Ames's users improves the worker's quality of work and saves him/her much time. Where clarification needs are expressed, freehand graphics on the IBM PC deliver.

But the more technical, presentation-quality graphics are also needed. Presentations are important to the Center and, along with adequate printing capabilities, can greatly influence trends at Ames. The kinds of packages available for the PC make for very professional documents. Dona Z. Meilach, in *PC Week* magazine, states that using computer graphics for presentations requires that these documents "be accurate, easy to interpret, and have impact." The major failures of presentation graphics are too much clutter and a lack of imagination. Moreover, with today's latest in software, Ames's PC users can make top-quality presentations with a touch of flair added in for good measure.

Computer users of today have better control of their jobs with today's graphics than the computer user of yesteryear. Whether graphics are needed for official, important presentations or just good clarity to help in understanding a problem, today's IBM PC has the capabilities to provide for almost all graphics needs. Ames users are aware of this and utilize it to their best advantage.

Word processing capabilities have also advanced considerably. Again, like graphics, word processing became popular as a computer-related function only after the arrival of the personal computer. Though word processing is used mainly for text articles (e.g., reports, etc.), nondocument mode is available for programming.

Here at Ames, word processors are found all over the center. The advantage of doing reports, outlines, and so on, on computers, rather than on typewriters is greatly appreciated. On the PC such programs used at Ames are PC Write, GemWrite, Lotus 1-2-3, and Wordstar 2000. Many of the best packages today are even capable of combining graphics and text. To be sure, almost all of today's typewriting is done on personal computers, and most of the personal computers at Ames are IBM PCs.

Programming with word processors must be done in nondocument mode. Christine Falsetti writes informally: "Normally, when you type a document it adds in special characters and flags, to format the document for printing, and so on--this is document mode." For this reason, a nondocument mode was created for programming. That way, programs don't "choke because [the computer] wouldn't know what to do with that stuff." The subject of programming, especially here at Ames, is too immense to approach in this type of paper, but suffice it to say that programming is used for almost everything--from simple menu programs that make human interface more friendly, to the most complex programs that only few understand.

The IBM PC plays a significant part in Ames' continuing work, especially with the latest in word processing software. Users make good use of this software and use it for all of their text editing needs--either programming or documenting. With the great amount of competition on the market, Ames' PC users can pick from the cream of the crop--and do just that.

"Database-management system: The collection of software required for using a database that handles the storage allocation, retrieval and update of records by presenting multiple views of the data to the users and programmers." So says the "Database Software Chart Definitions" in a recent *PC Week*. Why have a database-management system at NASA Ames? Because there is an ever-increasing amount of data that need to be kept--and in some sort of orderly fashion! Database management is vital to such a huge operation. For example, the number of employees is so large and the keeping of personnel records must be current. Salaries, addresses, phone numbers, etc., all need to be kept on file and managed in an orderly way--that's where good software comes in.

Flat-file database managers are not good software, but by understanding what they are, one can deduce what a good manager is. Flat files are two-dimensional file managers that provide no systematic view of looking at data. They are able to look at one file at any given time and must look at all the data instead of a certain field of data (i.e., names, salaries, phone numbers, etc.). In other words, in a personnel database, a flat-file management system would present all the data in one large group and not organize, say, the names together and a listing of personal information under each name.

On the other hand, hierarchical file database managers *are* good software. As the name suggests, these types of managers present a logical order, placing important items, or "flags," in a group. In a personnel file, the only group of data that exists would be a file of names--each followed by personal information. These types of systems make management easier and present a friendlier human interface.

Database management is a necessity at Ames, not only for personnel records, but for just about every other task. For example, if one needed an updated list of all the IBM PC users at the Center or needed to keep a file of all the people in a certain program along with information on them, database management systems would do the job. The point is, as needs present themselves, a good database management system must be ready and qualified.

Probably the most important facet of the computer world in a large center like Ames is communication. Not all the computers at Ames are PCs. Communication with mainframes is supported mainly by asynchronous (ASYNC) and bisynchronous (BSC) communication, though there are many other ways. With these two different types of communication, IBMs can "talk" with, send and receive data to and from, and electronically mail information to virtually every other machine around the Center.

Bisynchronous communication provides 3270 emulation, allowing users to communicate with the IBM and IBM compatible mainframes. Here at Ames, the closed (personnel information) and open (programming) systems run bisynchronous protocol and are connected with IBM mainframes. With a BSC communication card in the PC, a user has access to the open and closed systems if he/she has an account on a system.

Asynchronous communication is available by adding an ASYNC communication card into the IBM PC. ASYNC is the vital link between almost all personal computers and terminals at the center. With the addition of the card, the user can work with the VAX and many other mainframes via the Micom Switching Network which provides linkup between machines and also gives general information regarding the whole network. Through the Network, access to the whole of Ames (and even the world) is given.

Over the years, trends in the computer industry have affected what systems, hardware, software, etc., NASA uses and in turn have initiated trends in the Ames computer world.

Thanks to capitalism and specifically, competition, the computer industry remains an area where the products keep improving and prices stay relatively low. Competition in the market also results in useful innovations. Recently, the market has made a movement toward more power for the user and more user friendliness. Regarding increasing power, recent trends have moved toward faster processors, smaller chip design, more memory storage, and (probably most important of all) networking. User friendliness is in high demand also since the computer is reaching users who need not or don't have time to become familiar with operating systems (e.g., the student, draftsman, architect, scientist, teacher, and other technical user). Recent advances have to do with ergonomic/human factors (e.g., terminals that are easy to read, comfortable keyboards with logical position of keys, etc.), windowing, and menu- and mouse-controlled workbenches that make the operating system seem almost nonexistent. As these two trends make work for the user much easier, offspring trends in the Ames environment have increased the productivity of employees.

Likewise for Ames, a movement toward two specific goals is taking place: (1) "dumb" terminals are "out" and "intelligent" workstations are "in," and (2) superior interactive capability must be provided for the user. A workstation is said to be "dumb" when there is no CPU present. For example, a VT100 terminal on a desk must be connected to a mainframe in order to function--there is no CPU present. The trend at Ames these days is moving toward a replacement of terminals with personal computers with at least asynchronous or bisynchronous communication cards that have all the power of a personal computer and still have access to mainframes. With these

"intelligent" workstations, employees can do more work faster on their PCs rather than compete for CPU time on a busy mainframe. Intelligent workstations also have an effect on another trend moving toward superior interactive capabilities for the users. This trend calls for a high-quality relationship as the user interacts with the computer. It requires that the computer has excellent response time and is easy to use. Like intelligent workstations, superior interactive capability saves time for the user and increases his/her computing power and productivity.

In the future, the IBM PC will have a greater role in the higher purpose of Ames and will continue to grow in power. Networking will have a large role in the increase of the IBM PC's significance at Ames.

As it is now, a user must go through a mainframe in order to communicate with other machines and other workstations. In the future, the mainframe, the "middle man," will eventually be eliminated and workstations will be able to communicate directly with each other as well as work directly with supercomputers like the Cray-2. With this new power, "traffic" over the mainframes will decrease greatly, allowing each individual user more time and more power. In addition, with the direct accessibility of the supercomputers, users will be able to submit their jobs to a computer that is much faster and much more powerful than the mainframes, and consequently, a very large amount of time will be saved by each user, and the quality of work will increase to a new high.

With such a bright future at Ames, the IBM PC is bound to remain at the Center for a long while. With the latest advances in graphics, word processing, database management, and communication, each individual at Ames will have more power at his/her fingertips as computer-interaction becomes less confusing. Competition and trends in the industry will continue to produce high-quality software and hardware, and the offspring trends at Ames will make workers more productive. "Ames applies the technology to increase worker productivity," writes Christine Falsetti. I think this is true and believe that the IBM PC will continue to be a significant and useful part of the goals and dreams at NASA Ames Research Center.

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